

PATENT CLAIMS

1. A process for machining said workpieces (6) with a moving laser beam (4), wherein the laser tool (3) is held by a multiaxial mechanical manipulator (2) at a manipulator hand (8) at a spaced location above the workpiece (6) and moved along a predetermined path during a displacing motion, **characterized in that** a, at least partially oppositely directed compensating motion of the laser beam (4) is superimposed to the displacing motion during the machining operation.

2. A process in accordance with claim 1, **characterized in that** the workpiece (6) is machined intermittently, while machining phases and transport phases alternate, wherein the point at which the laser beam (4) reaches the surface gets ahead of the laser tool (3) or the low end of a flange system of coordinates at the beginning of a machining phase and trails it at the end of the machining phase.

3. A process in accordance with claim 1 or 2, **characterized in that** a, at least partially transversely directed compensating motion of the laser beam (4) is superimposed to the displacing motion during the machining operation.

4. A process in accordance with claim 1, 2 or 3, **characterized in that** the velocity of displacement \underline{V}_R is greater than the oppositely directed compensating velocity \underline{V}_w .

5. A process in accordance with one of the above claims, **characterized in that** the velocity of

displacement $\underline{V_r}$ is greater than the machining velocity $\underline{V_s}$ of the laser beam (4) at the workpiece (6).

6. A process in accordance with one of the above claims, **characterized in that** the compensating motion of the laser beam (4) is an angular motion.

5 7. A process in accordance with one of the above claims, **characterized in that** the compensating motion of the laser beam (4) is performed by a pivoting motion of the manipulator hand (8) about one of its said hand axes.

8. A process in accordance with one of the above claims, **characterized in that** the laser tool (3) is held by means of a extension arm (5) at a spaced location from the manipulator hand (8).

10 9. A process in accordance with one of the claims 1 through 6, **characterized in that** the compensating motion of the laser beam (4) is performed by a mobile scanning means (17) at the laser tool (3).

10. A process in accordance with one of the above claims, **characterized in that** the laser beam (4) is directed toward the workpiece (6) at the beginning of machining with a obliquely
15 forwardly directed beam angle α , α .

11. A process in accordance with one of the above claims, **characterized in that** the laser beam (4) is directed toward the workpiece (6) at the end of the machining with an obliquely

rearwardly directed beam angle β , β .

12. A process in accordance with one of the above claims, **characterized in that** the manipulator (2) performs a, essentially constant displacing motion during the machining.

13. A process in accordance with one of the above claims, **characterized in that** the manipulator (2) performs a, essentially constant or accelerated displacing motion during the transport phases between the machinings.

14. A device for machining said workpieces (6) with a moving laser beam (4), wherein the laser tool (3) is held by a multiaxial mechanical manipulator (2) at a manipulator hand (8) and is movable along a preset path during a displacing motion, **characterized in that** the manipulator (2) has a means for generating a compensating motion of the laser beam (4), which said motion takes place during the machining operation and is directed opposite and is superimposed to the displacing motion.

15. A device in accordance with claim 14, **characterized in that** the manipulator (2) has a multiaxial manipulator hand (8), in which at least one said hand axis can be controlled independently from the displacing motion.

16. A device in accordance with claim 14 or 15, **characterized in that** the laser tool (3) is mounted on the manipulator hand (8) by means of a extension arm (5) that creates a distance.

17. A device in accordance with claim 14, 15 or 16, **characterized in that** the laser tool (3) has a focusing optical system for generating a fixed-angle laser beam (4).

18. A device in accordance with one of the above claims, **characterized in that** the laser tool (3) has a fixed focal distance.

5 19. A device in accordance with one of the above claims, **characterized in that** the laser tool (3) has a focal distance of approx. 150 mm to 400 mm.

20. A device in accordance with claim 14, **characterized in that** the laser tool (3) has a mobile, controllable scanning means (17).

10 21. A device in accordance with one of the above claims, **characterized in that** the manipulator (2) is designed as a, at least six-axis articulated-arm robot.

22. A device in accordance with one of the above claims, **characterized in that** the laser tool (3) is designed as a welding tool.